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TEST KIT, CONDITION, CLANSMAN RADIO

TECHNICAL HANDBOOK - TECHNICAL DESCRIPTION

Note...

These Pages 1-14 (Part 1) and 1001-1011 (Part 2), Issue 3 supersede Tels M 662 (no parts) Pages 0-02, 1-29 and 1001-1002, Issue 1, Pages 1003-1004, Issue 2 and Pages 1005-1009 and 2001, Issue 1. The information has been completely revised.

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INTRODUCTION

GENERAL

1. This Part 1 consists basically of three sections, an introduction, a brief description and a more detailed description. The introduction includes a statement of the role and purpose of the equipment. The brief description details the construction and, under 'outline of working', describes the equipment in terms of simple block diagrams. The detailed description expands the 'outline of working' into terms of more detailed functional diagrams.

ROLE AND PURPOSE

2. The equipment enables users to check the taskworthiness of certain Clansman radios by providing a simple means of checking:

a. Transmitter power output.

b. Receiver sensitivity.

c. Antenna systems.

3. Transmitter power is indicated on the test set meter the scale of which is divided into two sections; a green section which is marked GOOD, and a red section which is marked BAD. A 17-position switch selects the appropriate meter sensitivity for the Radio Under Test (R.U.T.). When checking receiver sensitivity the test set is used to introduce attenuation appropriate to the operating range of the r.u.t.

4. The receiver and antenna system checks require the use of an additional Clansman radio of similar frequency coverage (working radio (w.r.)).

5. A separate coaxial cable checker is provided, to allow checking of the cables used with the test set.

MAIN PARAMETERS

Operational parameters

6. The test kit is designed to test the following equipments:

RT 320	RT 353
RT 321	RT 349
RT 350	A.R.F.A.T.
RT 351	

Physical data

7.	Depth:	355 mm (14 in.).
	Width:	265 mm (10.5 in.).
	Height:	222 mm (8.75 in.).
	Weight:	11.5 kg (25.3 lb).

Climatic range

8.	Temperature:	
	Storage:	-40 °C to +85 °C.
	Operational:	-5 °C to +40 °C.
	Humidity and physical conditions:	Specification REMC 20FR, Issue 6 Cat IV, less (8c).

Transportation data

9.	Operation and storage:	Up to 2500 m (8000 ft).
	Air pressure range:	For air transportation a pressure relief tap must be opened.

Packaging data

10.	Packaging to:	SRDE/PKG/620-3592.

Electrical data

11.	R.F. power measurements:	70 mW to 75 W, 50 Ω, V.S.W.R. <1.2 : 1, 1.5 MHz to 76 MHz. Accuracy ± 10 % except RT 349 70 mW ± 15 %.
	Maximum power dissipation:	75 W for 15 min.
	Receiver sensitivity:	
	Variable attenuation:	100 dB in 10 dB steps 10 dB in 1 dB steps.
	Fixed attenuation:	94 ± 5 dB.
	Sidestep oscillator:	200 kHz ± 20 Hz.
	Audio oscillator:	375 Hz warbling at 2.5 Hz, output 4.0 mV.

Power requirements

12. A d.c. supply of 12 V to 29 V, 30 mA is required to power the sidestep oscillator. This is normally derived from Pin C of the audio socket of the r.u.t. or w.r.

CODING AND IDENTIFICATION DATA

13. The equipment contains the following sub assemblies:

a. Load Unit Assembly, Z4/5820-99-639-0987.

b. Coaxial Switch Assembly, Z99/5930-99-639-0989

c. Oscillator/Mixer Unit Assembly, Z4/5820-99-639-0994

d. Attenuator Assembly, Z4/5820-99-639-0988

e. Potentiometer Assembly, Z4/5820-99-639-0990.

14. No sub assembly prefixes are used to denote the location of the individual components. They are coded sequentially throughout the equipment, eg R1-R119, C1-C21.

REPAIR POLICY

15. Unit level repairs are limited to the repair or replacement of the accessories and certain front panel items (eg knobs). All other repairs may be undertaken at Field level. There are no Centrems. The test set consists of a front panel fitted with some detailed parts (eg meter) and five sub assemblies, which are all designated as discard items. Full details are given in Tels M 666.

ASSOCIATED PUBLICATIONS

16. CES: 43787.
IPC: Army Code No 61600.
User Handbook: 61653.

BRIEF DESCRIPTION

CONSTRUCTION

17. The test set is housed in an RAE case complete with a cover. The case when fitted with its cover will provide climatic protection against humidity and driving rain to the requirements of REMC/20FR Issue 6, Category IV.

18. The cover is fitted with an inner lid which carries an instruction plate. A knurled fixing nut is fitted to the lid which when unscrewed gives access to a stowage compartment. This compartment contains the following items:

a. Antenna, Pickup Loop, Z4/6625-99-633-6107 Qty 1

b. Checker Assembly, Cable, Z4/6625-99-633-6106 Qty 1

c. Cable Assembly, Power Electrical, Z42/5995-99-633-6105 Qty 1

d. Cable Assembly, R.F. 2 m Lg, Z42/5995-99-633-6102 Qty 2

e. Cable Assembly, R.F. 10 m Lg Z42/5995-99-633-6103 Qty 1

f. Cable Assembly, R.F. 153 mm Lg, Z42/5995-99-633-6104 Qty 2

g. Adaptor Aerial, RT 349, Z4/6625-99-649-5582 Qty 2

19. The front panel (Fig 1), which carries the meter, switches and sockets, is fitted with two 'D' type handles which provide roll over protection to the front panel components.

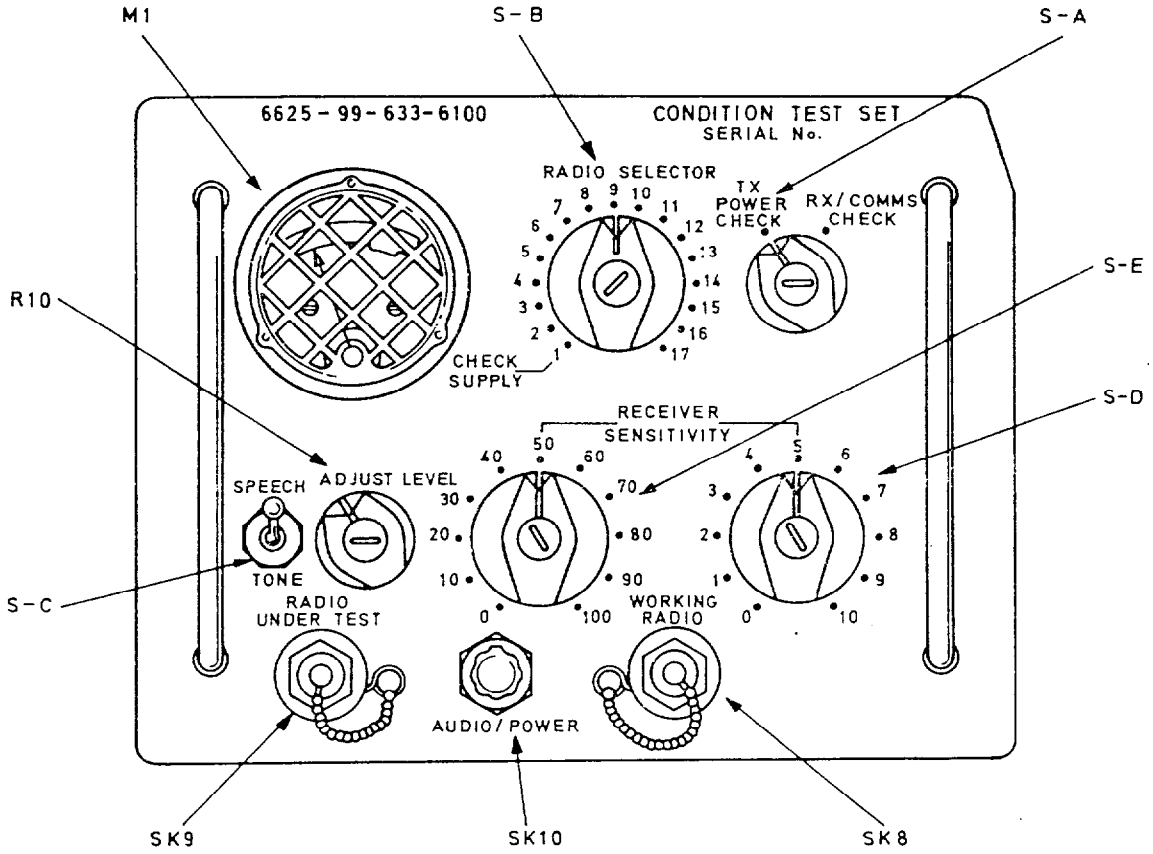

Fig 1 - Front panel

20. The Attenuator Assembly, the Coaxial Switch Assembly, and the Mixer/ Oscillator Assembly are fitted to the rear of the front panel. The Potentiometer Assembly fits to the side of the Load Unit Assembly, which is mounted on four pillars fitted at the corners of the rear of the front panel (Part 2, Figs 2005 and 2006).

OUTLINE OF WORKING

TX power check (Fig 2)

21. To carry out this check the antenna socket of the r.u.t. is connected to SK9 and the AUDIO/POWER socket (SK10) to the audio socket of the r.u.t. using the connectors provided. Switch SA is set to TX POWER CHECK. RADIO SELECTOR switch (SB) is set to the appropriate position for the type of set and facility being tested.

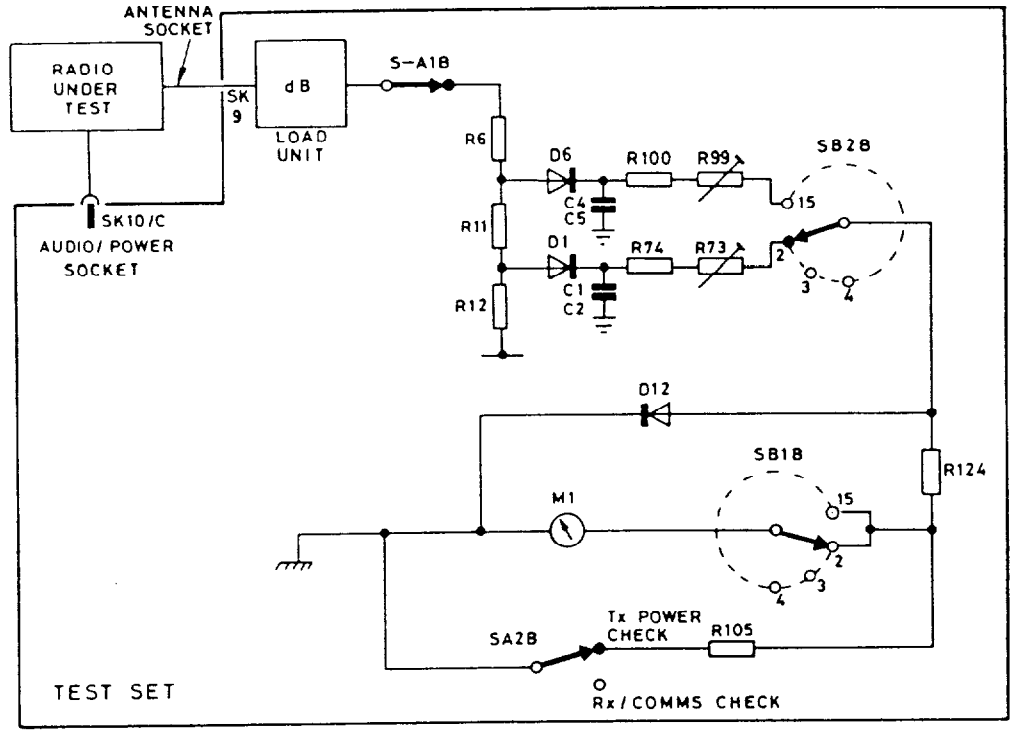

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Fig 2 - TX power check; simplified circuit

22. When switch SC is set to TONE it connects Pin F to Pin E of the AUDIO/ POWER socket (SK10) which causes the r.u.t. to go to the transmit condition. It also connects the output of the cyclic tone oscillator to the microphone input of the r.u.t. via Pins A and B of SK10.

23. The r.f. power is applied to the load unit which is a 50 Ω, 10.1 dB attenuator. The attenuated r.f. output is routed via SA to the divider chain (R6, R11 and R12). For radios other than the RT 349, the voltage developed across R12 is rectified by D1 and the r.f. is filtered by C1 and C2. The resultant d.c. is applied to Meter M1 via R74 (fixed), R73 (preset), SB2B, R124 (fixed) and SB1B. The preset is adjusted for a meter indication at the junction of the red and green sectors when the input power is the minimum acceptable for the r.u.t. corresponding to that particular setting of SB2 (Position 2 = RT 350, Position 3 = RT 351 etc).

24. When testing the RT 349 Position 15 of SB is used. Because the Tx power is much lower than in all other Clansman radios, this selects the voltage developed across R11 and R12 to be rectified by D6, filtered by C4 and C5 and passed on to the meter via R99 and R100.

25. Diode D12 affords meter protection in the event of SB being incorrectly set or a malfunction in the r.u.t. resulting in excessive power output. R105 is a fixed shunt on the meter in the TX POWER CHECK position of SA. Positions 16 and 17 of SB are not used.

RX/COMMS check, r.u.t. transmitting (Fig 3)

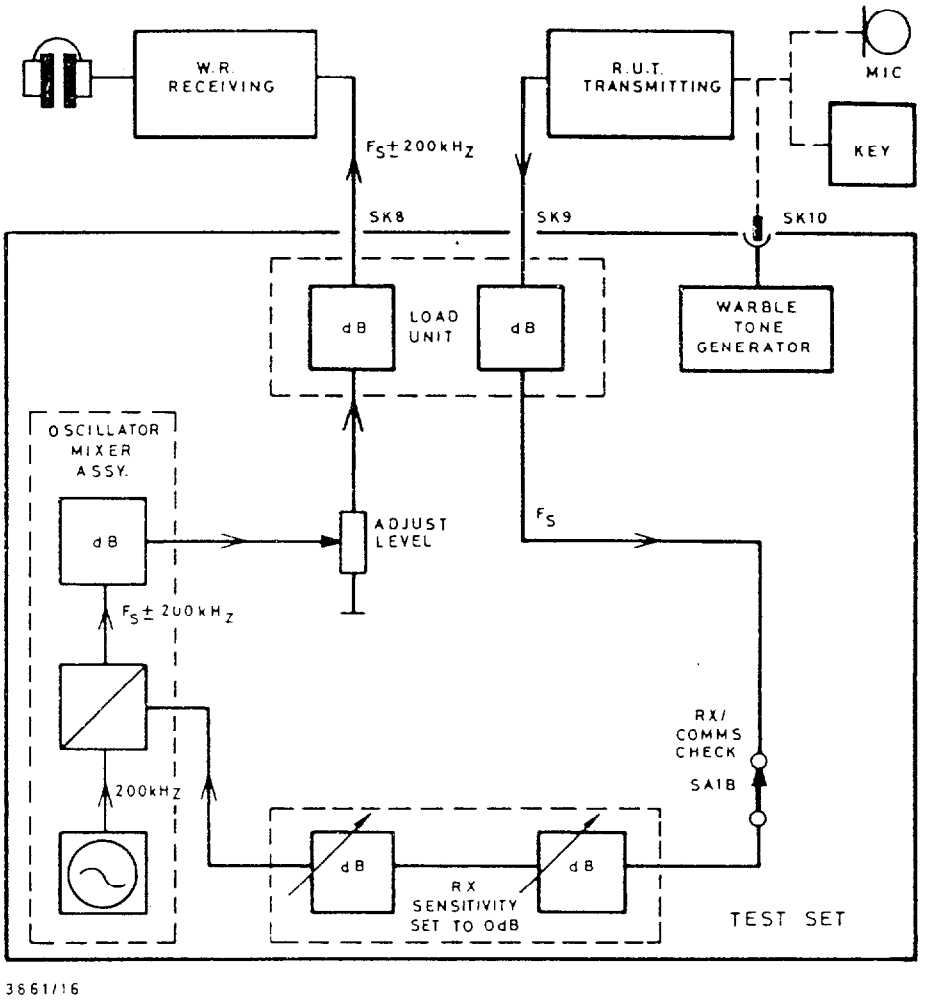

Fig 3 - RX/COMMS check, r.u.t. transmitting; block diagram

26. This test is to confirm that the modulating circuits of the r.u.t. are working satisfactorily. The r.u.t. is operated in the appropriate system mode, eg tone modulated, speech modulated or keyed. The r.f. output is taken through the load attenuator to the RECEIVER SENSITIVITY attenuators which are set to 0 dB and thence to the mixer. Here the signal frequency (F_S) is mixed with the locally generated 200 kHz signal to produce an output of $F_S \pm 200$ kHz. This output then passes through preset and fixed attenuators to the w.r. (The w.r. is tuned to a frequency of $F_S \pm 200$ kHz and is set to receive signals of the same mode as those transmitted by the r.u.t.

27. If an operator is carrying out the check without assistance he can modulate the r.u.t. with the cyclic tone generator in the test set. With an assistant, he can check normal operation using a microphone and c.w. operation by use of a key. In all cases the received signal should be clear and undistorted. With the variable attenuators set to 0 dB the path loss between SK9 (RADIO UNDER TEST) and SK8 (WORKING RADIO) is 94 dB. The 200 kHz sidestep of the frequencies is to avoid stray radiation effects which would exist if the r.u.t. and w.r. were operating on the same frequency.

RX/COMMS check, r.u.t. receiving (Fig 4)

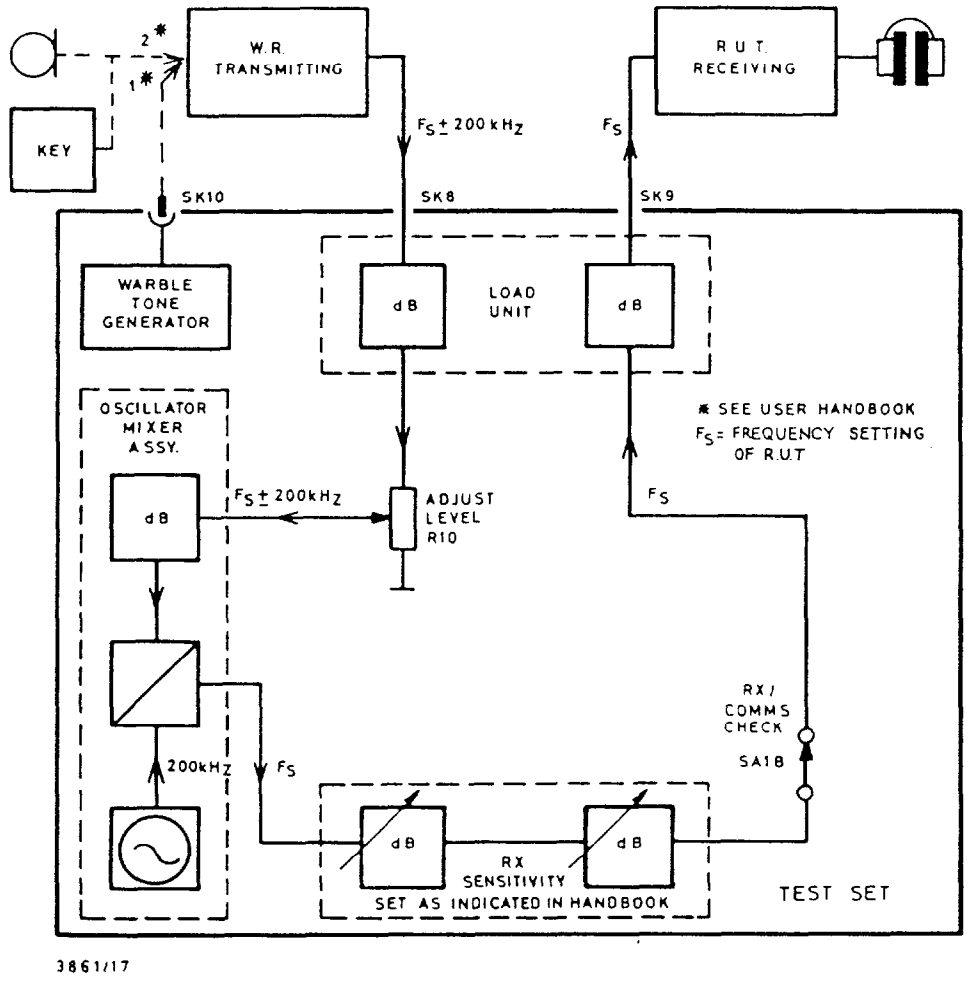

Fig 4 - RX/COMMS check, r.u.t. receiving; block diagram

28. The conditions for this test are essentially the same as described in Paras 26 and 27. This time however the w.r. is modulated and transmitting, whilst the r.u.t. is receiving. If the received signals are clear and undistorted then the receiver of the r.u.t. is working and not introducing any distortion. This is also a limited check of the frequency accuracy. Any difference in frequency between the w.r. and the r.u.t.(other than the 200 kHz) will result in the tone heard in the r.u.t. phones being different from that heard in the w.r. phones.

Receiver sensitivity check (Fig 5)

29. In this check essentially the same test is performed as described in Para 28. However this time the path loss is set to a figure which represents the expected range of the r.u.t. The User Handbook lists three requirements for this test:

a. The RADIO SELECTOR switch (SB) must be set to the position corresponding to the r.u.t. on the lowest power available (except RT 353 when the 1 W setting is used).

b. The transmitter power of the w.r. must be standardized so that any Clansman radio can be used to test any other Clansman radio (providing that it is of the same frequency and mode of modulation).

c. The RECEIVER SENSITIVITY attenuators must be set to a predetermined setting given in the User Handbook.

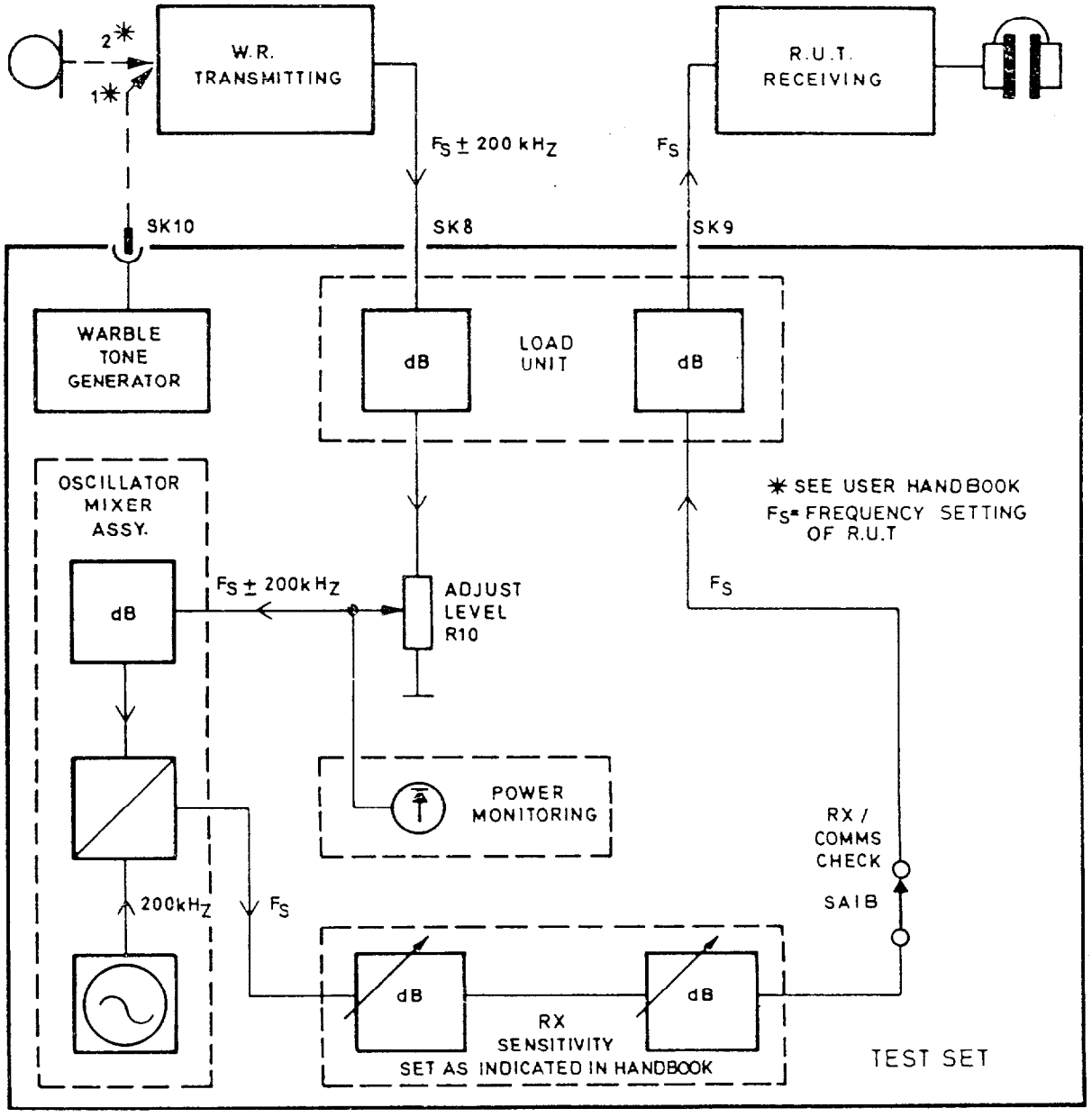

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Fig 5 - Receiver sensitivity check; block diagram

30. The working radio is set to the mode and power setting laid down in the User Handbook and is set to transmit. The ADJUST LEVEL control (R10) is then adjusted until the meter indicates at the junction of the GOOD/BAD sectors, thus standardizing the input signal. The path loss will be 94 dB (the fixed attenuation within the test set) plus the setting of the variable attenuators.

31. Two methods of carrying out this test are described in the User Handbook. In method one, requiring only one operator, the warbling tone is used to modulate the w.r. The operator has to decide whether he can hear the tone in the r.u.t. phones, ignoring any distortion or noise. If the results are inconclusive, eg when testing a h.f. radio in a noisy environment, the second method may be used. This requires two operators and inserts less attenuation between the w.r. and r.u.t. One operator speaks into the w.r. microphone, the second operator listens on the r.u.t. phones and decides whether the received signal is intelligible.

32. Resistor R104 is used to calibrate the fixed attenuation within the test set during the initial workshop setting up procedure.

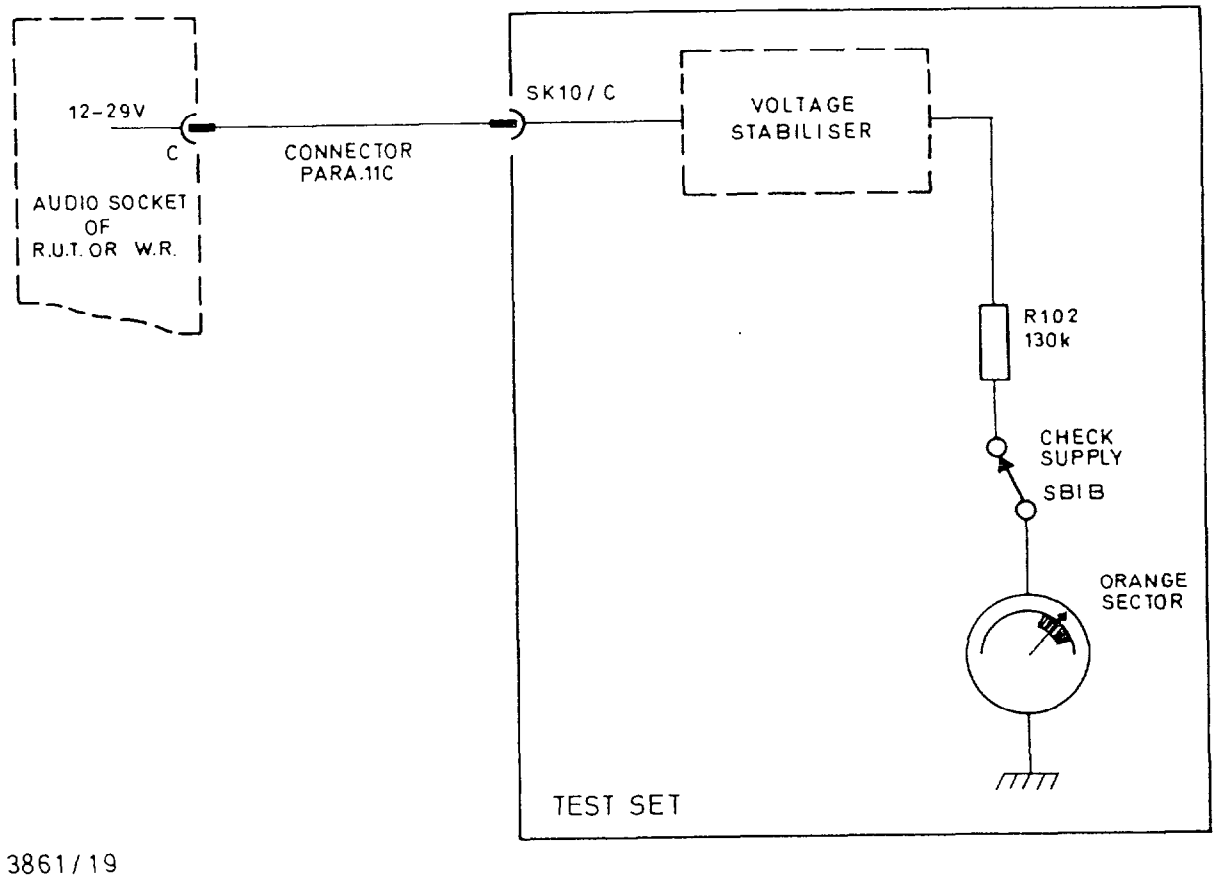

Fig 6 - Check supply; simplified circuit

33. The test set normally receives its supply voltage from Pin C of either the r.u.t. or w.r. audio sockets which are connected to the AUDIO/POWER socket of the test set by a connector (Para 18.c.). According to the type of set being tested this voltage can vary in the range 12 V to 29 V d.c. This supply is stabilized in the test set to between 8.6 V and 10.2 V d.c. In the CHECK SUPPLY position of SB this voltage is applied to the meter via R102 and if the supply is correct the meter will indicate within the orange zone.

Antenna check (Fig 7)

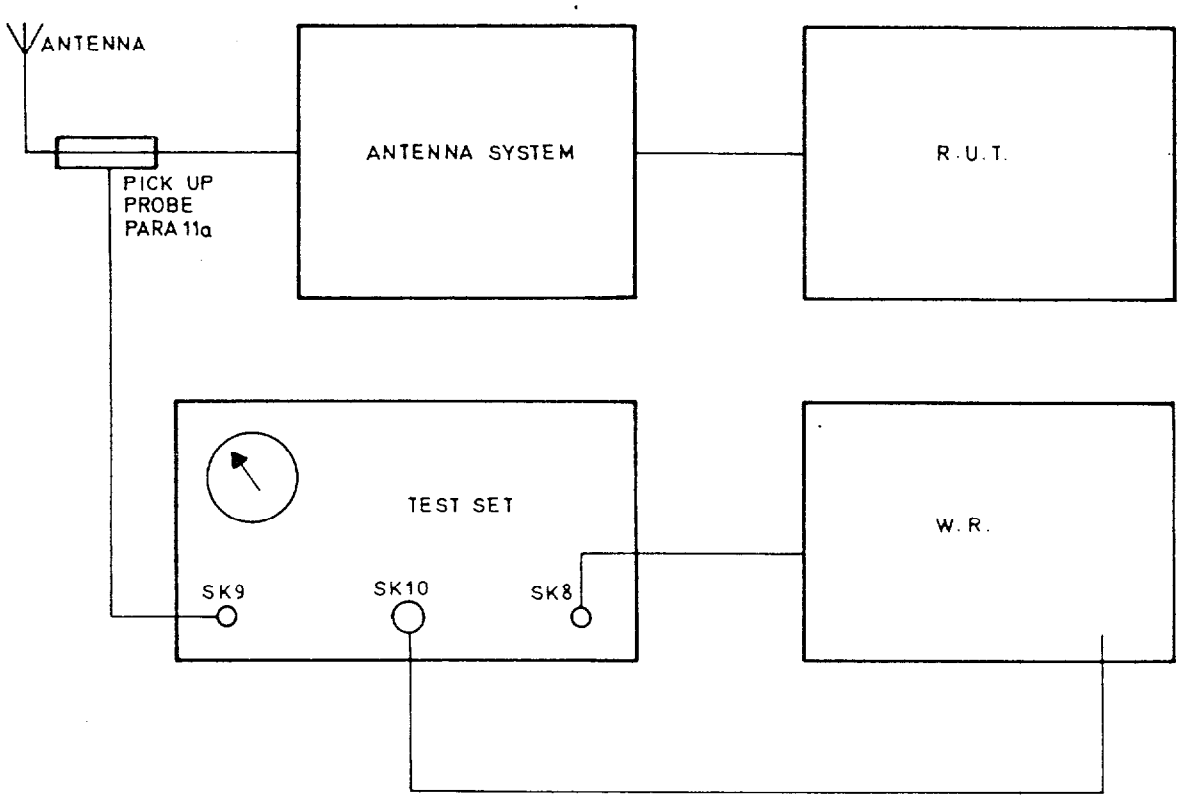

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Fig 7 - Antenna check; block diagram

34. In all the previous checks tests have been carried out at the r.u.t. antenna coaxial socket except on the RT 349. To ensure that the antenna system is satisfactory a pick up probe is used which clips onto the antenna rod of the r.u.t. If satisfactory reception occurs then the antenna system, ie coaxial connectors, antenna tuning units etc must be functioning. The test conditions and results are as for the RX/COMMS check described in Paras 26, 27 and 28.

Coaxial connectors

35. The cable checker (Para 18.b.) is used to prove the serviceability of the test kit coaxial cables. Power for the checker is derived from the audio socket of the w.r. or r.u.t. (Para 33). The lamp marked SUPPLY should be lit.

36. The r.f. cable to be tested is connected between two of the coaxial sockets (dependent upon the terminations). If the cable is serviceable the lamp marked CABLE will light. If either the outer or inner is open circuit or if they are shorted together the CABLE lamp will not light.

DETAILED DESCRIPTION
(Part 2, Figs 2001 and 2002)

POWER SUPPLIES AND STABILIZATION

37. The power supply for the test set is normally obtained from either the r.u.t. or w.r. The audio sockets of the radios have a d.c. voltage between Pin C (+ve) and Pin E (-ve). This varies between 12 V and 29 V d.c. dependent upon the type of radio and its supply.

38. The test set AUDIO/POWER socket (SK10) is connected to one of the radios by a 7-way connector (Para 18.c). The supply at SK10C and SK10E is taken via Pins 88 and 85 to Pins 1 and 2 of the Oscillator/Mixer Unit Assembly.

39. The positive supply passes to the collector of the series regulator (TR1), via D4 which provides reverse polarity protection. The base of TR1 is held constant by the Zener diode (D5) fed from the positive rail by R68. This ensures that over an input voltage range 12 V to 29 V the output at TR1 emitter (Pin 7) will be held within the limits 8.6 V to 10.2 V with a current drain of 30 mA.

40. Capacitor C6 provides a reservoir to smooth the output of TR1. Capacitors C20 and C21 r.f. decouple the input and output lines, preventing any r.f. breakthrough from the radio supply line.

OSCILLATOR/MIXER UNIT

41. This unit mixes the 200 kHz signal produced by TR2 and associated circuits with the signal from the r.u.t. or w.r. to produce a 200 kHz 'side-step'.

42. Transistor TR2 and associated circuit comprise a hybrid Colpitts/crystal oscillator with feedback between base and emitter provided by C7 and C10; the crystal (XL1) and its series trimming capacitors (C8 and C9) are connected between base and earth. C8 is adjusted for an oscillation frequency of 200 kHz $\pm$ 1 Hz. Resistors R69 and R70 set the base biasing conditions.

43. The collector load comprises one of the secondary windings of transformer T1, C3 tuning the winding to approx 200 kHz.

44. The primary of T1 is connected to the balanced mixer circuit (D2, D3, R63, R66, R65 and R64). R64 is adjusted to balance the mixer about earth.

45. The mixer operates in two modes. If the input is from the working radio at SK7 then the frequency will be $F_S \pm 200$ kHz (where F_S = frequency of r.u.t.). This signal will be attenuated by R56 to R62 before being applied to the mixer at Pin 5, and the mixer output will be fed out at SK6 via R67.

46. When the signal is applied at SK6 from the r.u.t., ie F_S, then addition will take place in the mixer and a signal $F_S \pm 200$ kHz will be produced and fed via R56 to R62 to SK7.

47. The other secondary winding of T1 is used to produce a test signal at TP6.

WARBLE TONE GENERATOR

48. The warble tone generator is located on the p.c.b. designated Potentiometer Assembly (Z4/5820-99-639-0990). It provides a signal of 4 mV 375 Hz modulated at 2.5 Hz, at Pins 16 and 19 (T2 secondary). This is used to modulate the transmitter when RX/COMMS check is being carried out (Paras 26-28). SC must be switched to TONE.

49. Transistors TR5 and TR7 are connected in a conventional multivibrator configuration the time constants of the resistance/capacitance coupling being such that the circuit oscillates at a nominal 2.5 Hz. The collector load of TR7 consists of two resistors (R110 and R119) which connect to TP1.

50. Transistors TR4 and TR6 are also connected as a multivibrator with resistance/capacitance elements providing an oscillatory frequency of 375 Hz. However the base supplies for TR4 and TR6 are taken from TP1 via R117 and R118. The potential at TP1 will be varying between approx 9 V and 4 V as TR7 is switched on and off at 2.5 Hz intervals. Thus the amplitude of the 375 Hz signal will be varying at a 2.5 Hz rate producing a 'warbling' tone at TP2.

51. This signal is taken through the filter (R116-C16, R115-C15) to the voltage divider (R122-R123). The output at the slider of R123 is fed via C13 to the base of a.f. amplifier (TR3); R107 and R121 provide the base bias. TR3 is connected as an emitter follower and its output is taken from R120 via C11 and R114 to the primary of the output transformer (T2).

52. The secondary of T2 is connected to output Pins 16 and 19. Preset resistor R123 is adjusted so that when Pins 16 and 19 are loaded with 150 Ω, the potential across them is 4.0 mV.

53. Diodes (D8, D9, D10 and D11) connected in series with the emitters of TR6, TR4, TR7 and TR5, protect the base emitter junction against transient voltages during switching.

R.F. LOAD UNIT

54. The r.f. load unit houses two power attenuators. Each attenuator has an input impedance of 50 Ω and a nominal loss of 10.1 dB when terminated by 50 Ω. The power rating of each attenuator is a maximum of 75 W for 15 min. The v.s.w.r. of each load is better than 1.2:1.

55. The assembly consists of three aluminium tubes held together by heat conducting fins. Two of the tubes are used to house the resistors and are filled with silicone oil. The third tube is used as an expansion chamber, to allow for the change of volume of oil with temperature. The oil is retained by a piston which moves in the expansion chamber in sympathy with the volume of oil. The whole assembly is sealed and must not be opened.

METERING CIRCUITS

56. Meter M1 is a basic 0-100 μA f.s.d. moving coil instrument, with its glass protected against damage by a robust grille. A diode (D12) is connected across the movement and its series resistor (R124), to guard against damage by overvoltage.

57. When the meter is used to CHECK SUPPLY the meter (+ve) terminal is connected via R102 to the 9 V positive supply rail and meter negative terminal to earth (Para 33).

58. R.F. power measurement is described in Paras 21 to 25. During this test the meter is shunted by R105.

59. When RX/COMMS check is selected R105 is disconnected and the meter is shunted by R103 and R104. R104 is adjusted during calibration of the fixed attenuation of the test set to give a GOOD/BAD junction deflection of the meter.

COAXIAL SWITCH UNIT

60. The Coaxial Switch Assembly contains a 5-pole changeover switch, a potential divider (R6, R11 and R12), two r.f. rectifiers (D1 and D6) and their reservoir/bypass capacitors (C1, C2, C4 and C5). (See Paras 21 to 25). One position is for r.f. power measurement and the other for receiver/communications checks.

STEPPED ATTENUATOR UNIT (Part 2, Fig 2003)

61. This unit consists of two switches (SE (10 dB steps) and SD (1 dB steps)) contained in a cast aluminium unit. The attenuator has a characteristic impedance of 50 Ω and a maximum loss of 110 dB (ten steps of 10 dB plus ten steps of 1 dB). Resistor R34 protects the attenuator in the event of the r.u.t. being accidentally switched to transmit during receiver testing.

3861/Tels

END of Part 1

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3. This information may be disclosed only within the Defence Department of the recipient Government, except as otherwise authorized by Ministry of Defence (Army).
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TEST KIT, CONDITION, CLANSMAN RADIO

TECHNICAL HANDBOOK - FAULT FINDING AND REPAIR DATA

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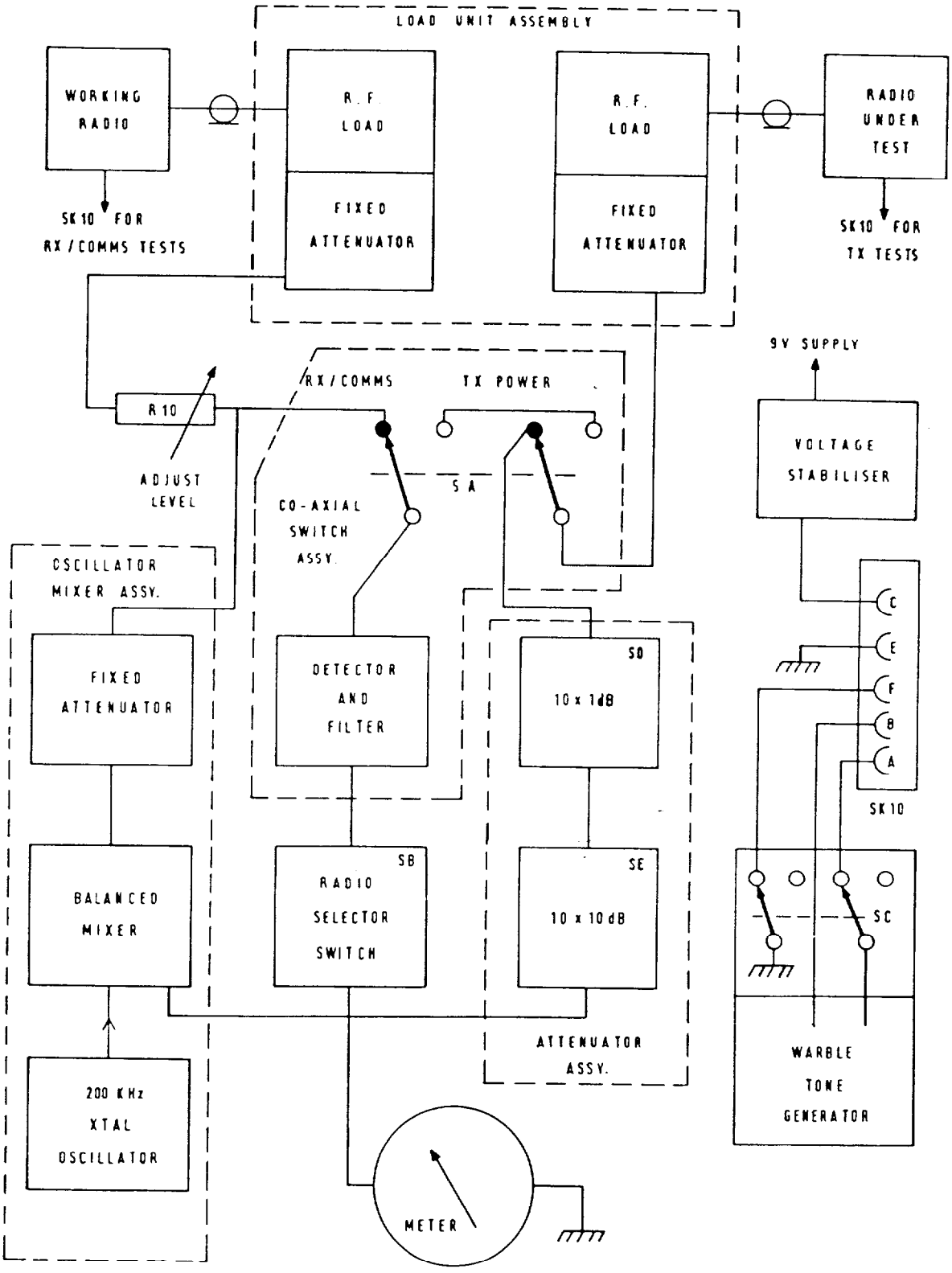

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Fig 2501 - Block diagram

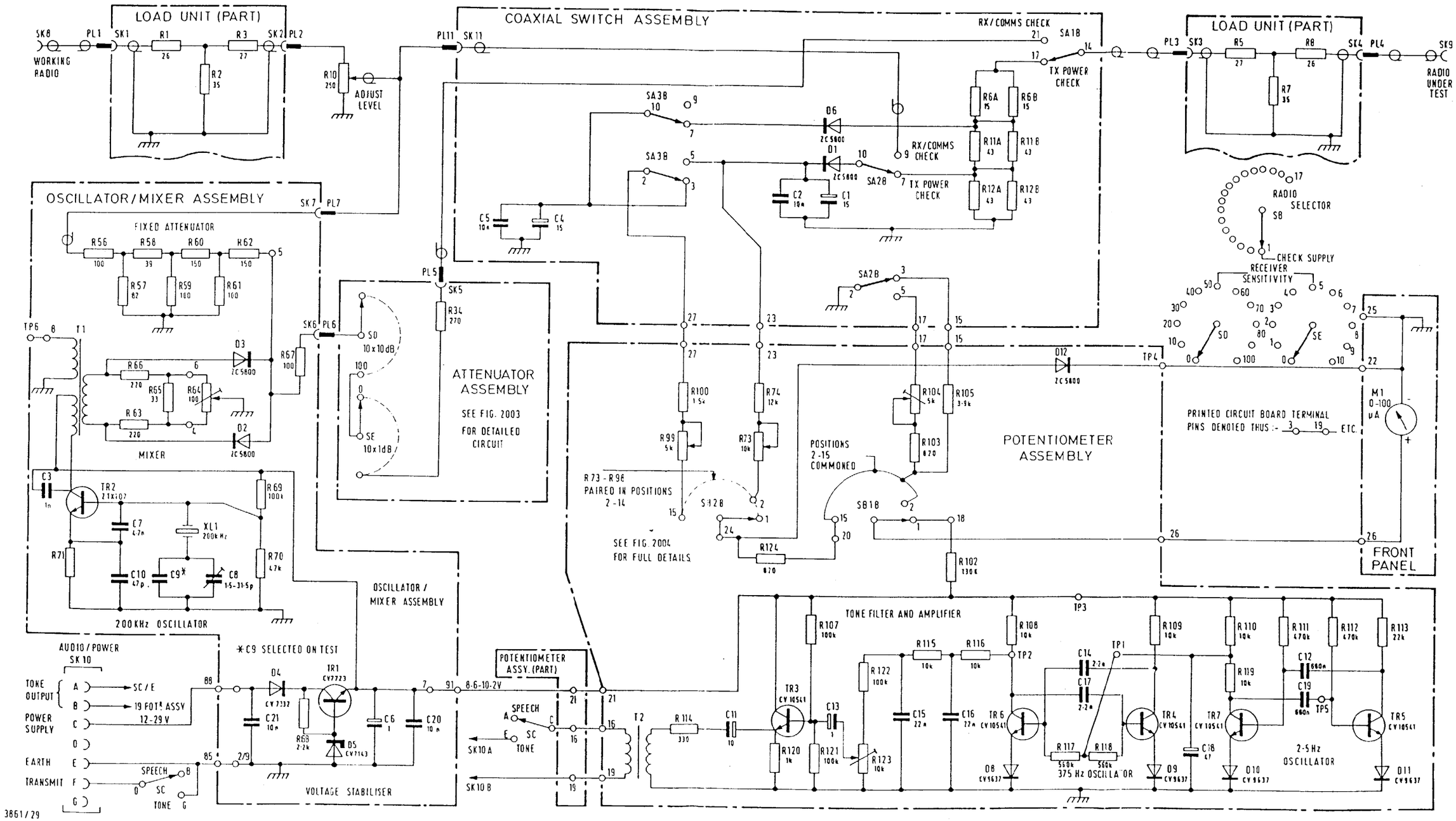

Fig 2502 - Main circuit diagram

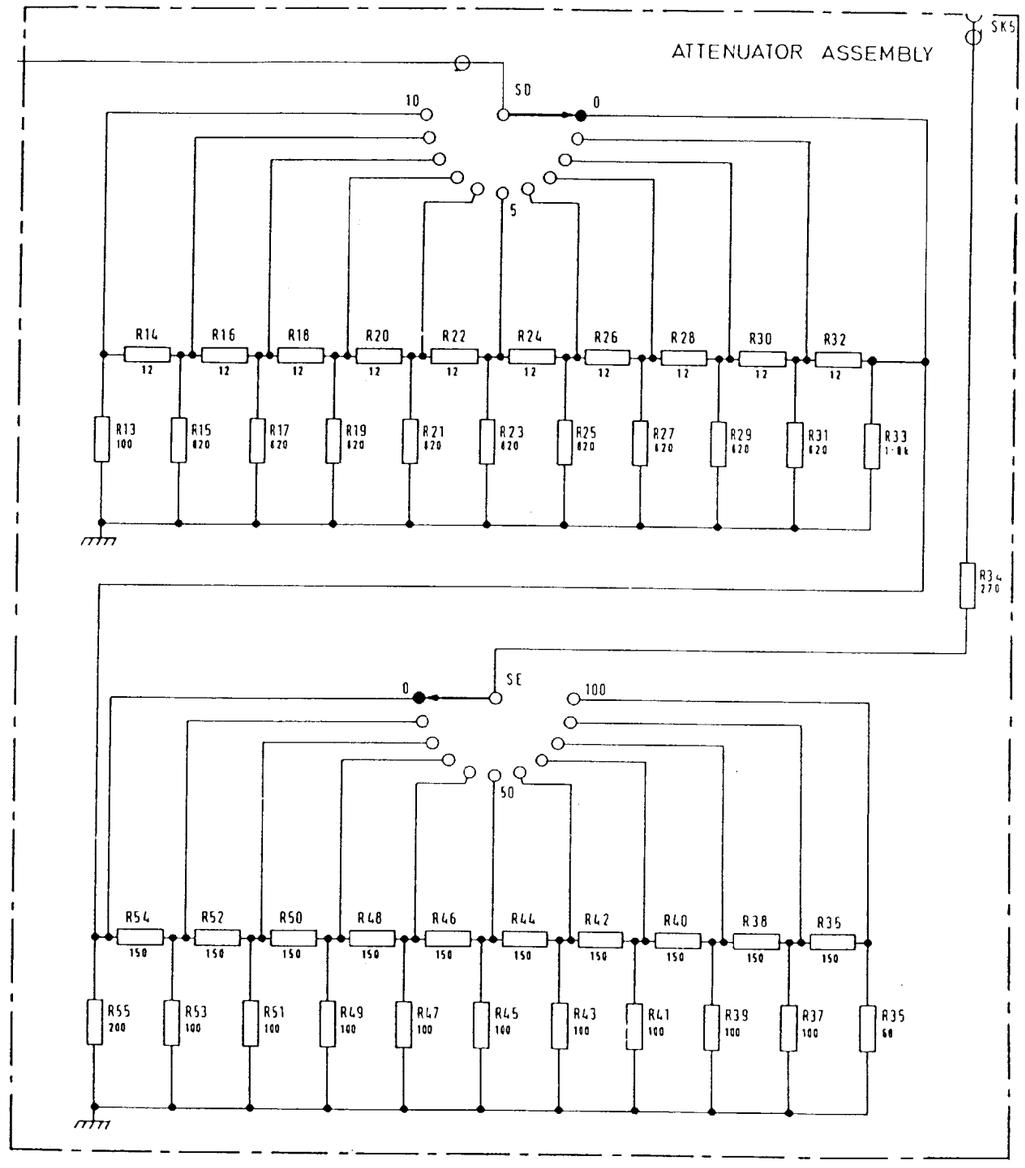

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Fig 2503 - Attenuator Assembly; circuit diagram

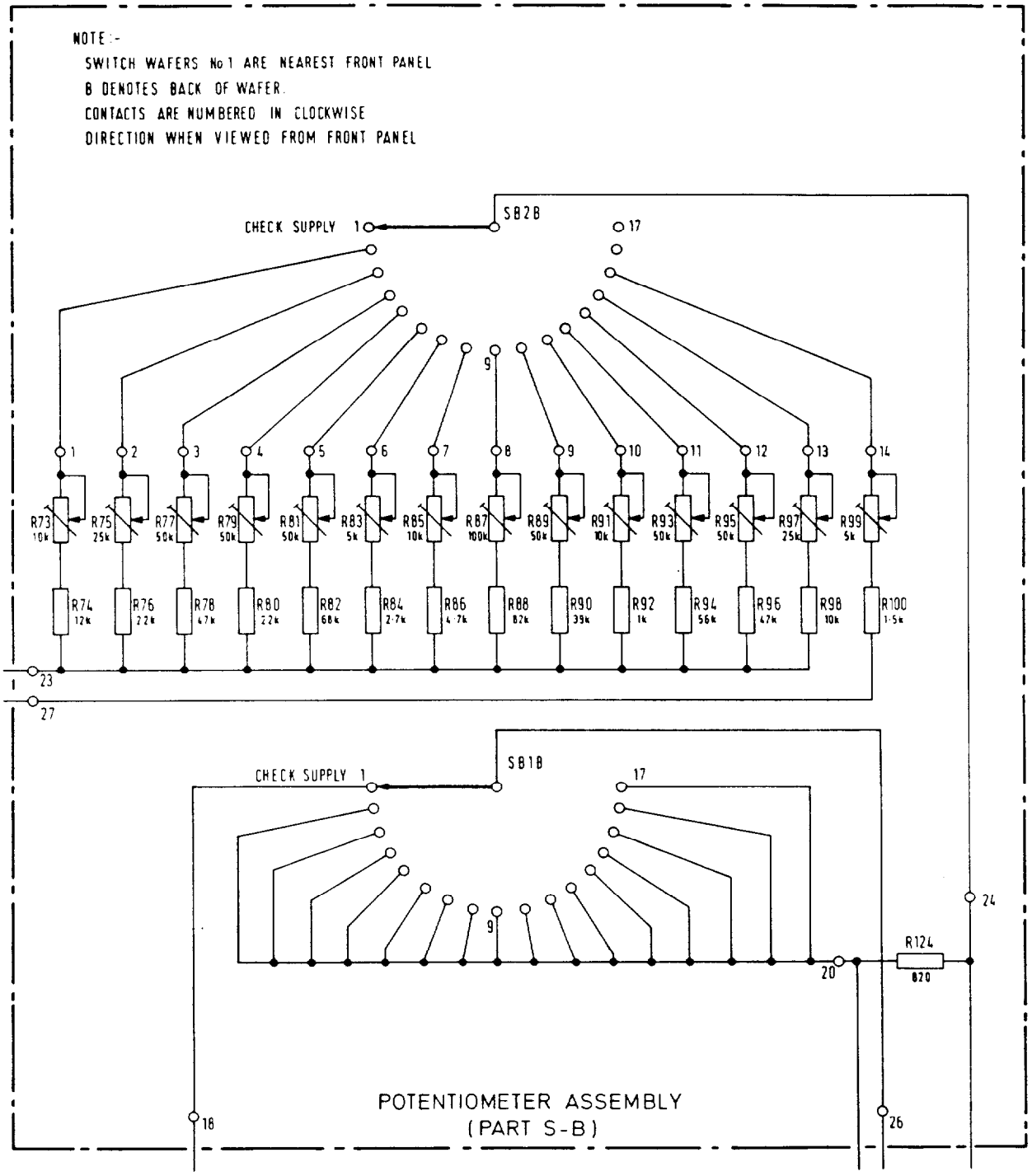

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Fig 2504 - Potentiometer Assembly; circuit diagram

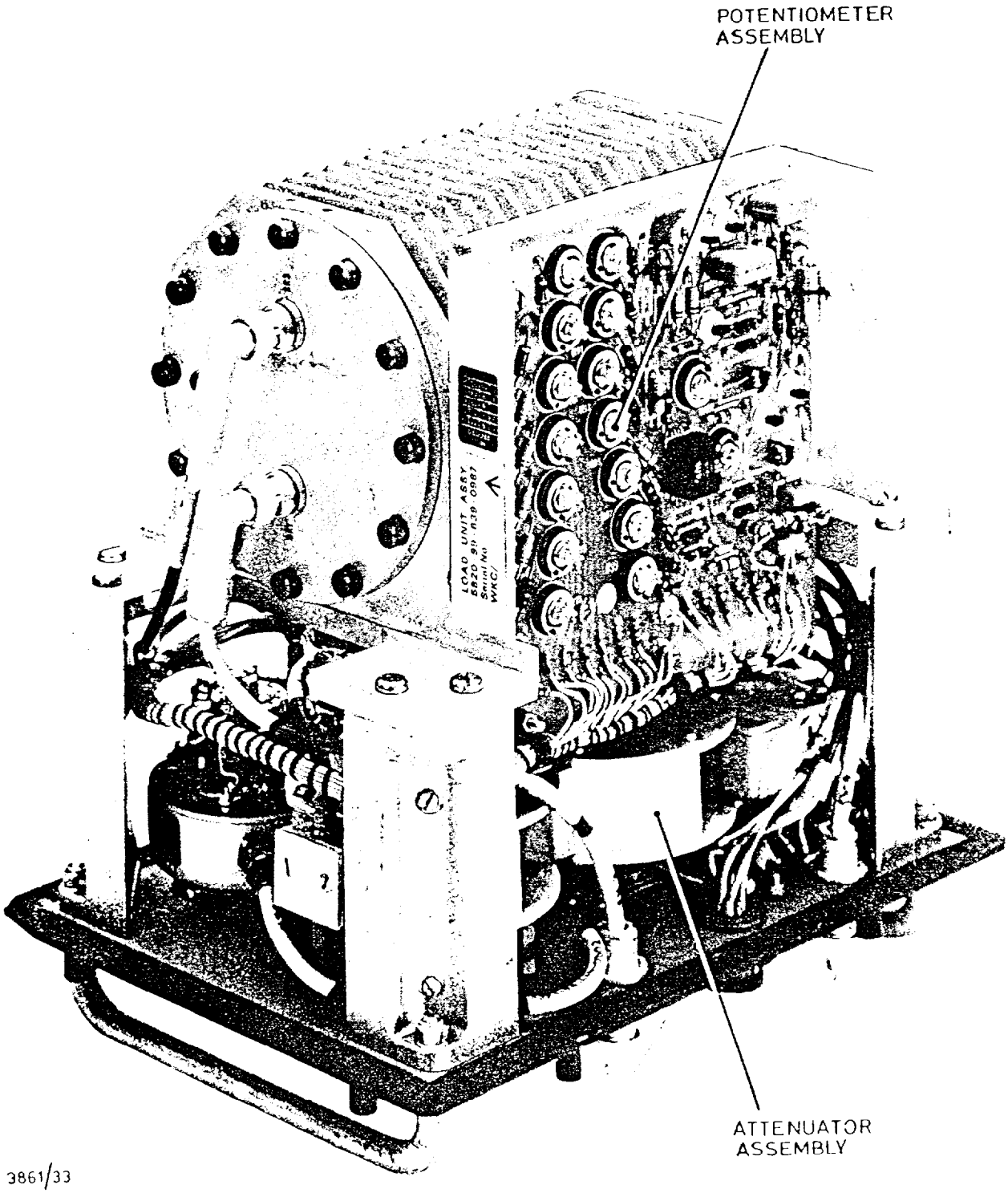

Fig 2505 - Construction, internal view with p.e.c.

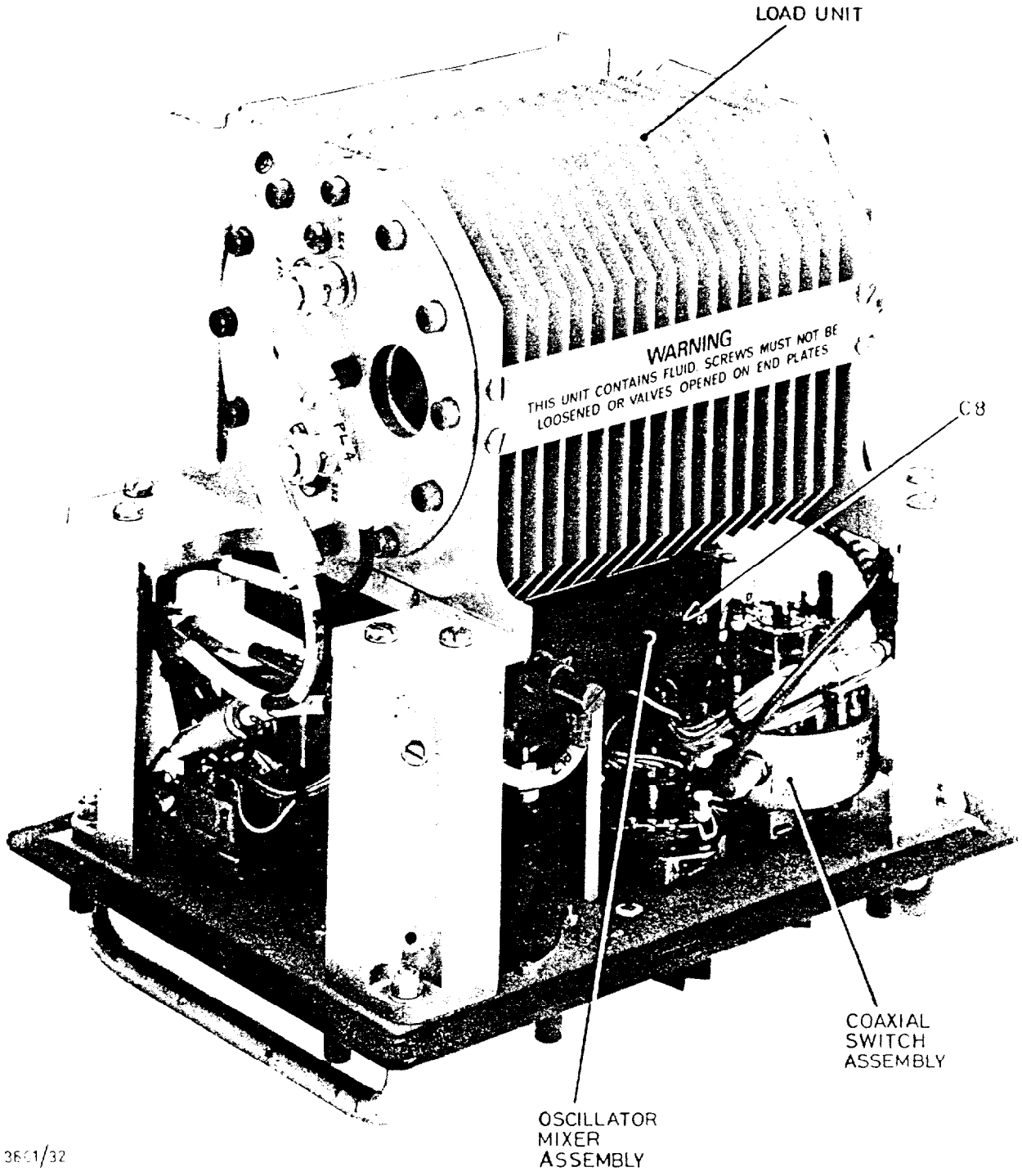

Fig 2506 - Construction, internal view

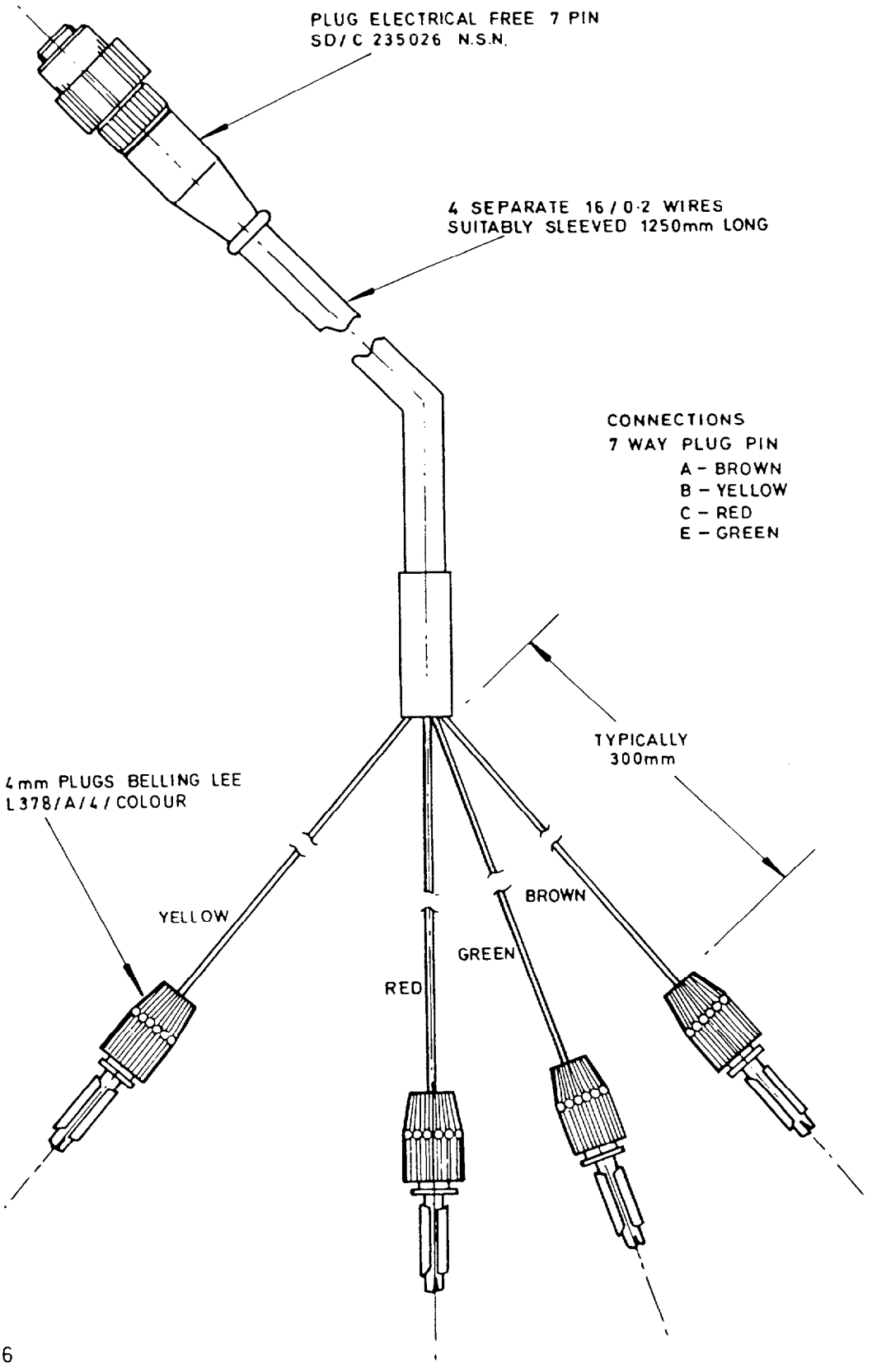

Fig 2507 - Connector, 7-way plug to 4 mm plugs
(local manufacture)

FAULT LOCATION DATA

1. Table 2501 lists faults and probable causes based on the specification tests. It is assumed that testing has been carried out sequentially and has given satisfactory results up to the test which fails. Supporting test data is given in Tels M 664.

Table 2501 - Fault location data

Test No (1)	Test result (2)	Suspect (3)
1	No indication on meter	D.C. input supply (Pins 88, 85) D.C. regulator output (Pins 91, 85) LL 8.6 V UL 10.2 V Meter circuits
	Below orange sector	D.C. regulator output 11 8.6 V R 102. Meter.
	Above orange sector	D.C. regulator output LL 10.2 V R102. Meter.
2	No indications Positions 2 to 15	Coaxial lead SK9 to PL4 Load Unit Assembly (SK4 and SK3) Coaxial Switch Assembly, SB2B, SB1B, R124
	No indications Positions 2 to 14	Coaxial Switch Assembly
	No indication Position 15	Coaxial Switch Assembly SB2 Position 15
	All indications high or low	SA2B, R105
	Some positions high/low	Potentiometers require adjustment
3	Indication high/low	Load Unit Assembly Coaxial lead from SK9 to PL4
4	Indication high/low	Cable Assembly
5	No indication or Indication high/low	Coaxial lead from SK8 to PL1 Load Unit Assembly SK1 and SK2 R10, Coaxial lead from R10 to PL11 Coaxial Switch Assembly R103, R104
6	Attenuation low/high	Coaxial leads from SK8 to PL1 and from SK9 to PL4 Load Unit Assembly SK1 and SK2, SK3 and SK4 Oscillator/Mixer Unit Assembly SK7 and SK6 Attenuator Assembly (not at 0 dB)

(continued)

Table 2501 - cont

Test No (1)	Test result (2)	Suspect (3)
7	Output out of limits	R 123 requires adjustment.
	Waveform incorrect	Tone oscillator (part of Potentiometer Assembly)
	High resistance between Pins E and F	SC, SK10 wiring
8	Frequency out of limits	C8 requires adjustment

Table 2502 - Fault finding test information

Assembly (1)	Testing information (typical figures) (2)
Load Unit Assembly	Input at SK4, 1 V r.m.s. at 1000 Hz Output at SK3 (loaded with 50 Ω) LL 290 mV UL 335 mV Input at SK1, 1 V r.m.s. at 1000 Hz Output at SK2 (loaded with 50 Ω) LL 290 mV UL 335 mV
Oscillator/Mixer	Input, Pins 88 (SK10-C) (+ve) and Pin 85 (SK10-E) (-ve), LL 15 V UL 29 V d.c. Output, Pin 91 (+ve) and Pin 85 (-ve) LL 8.4 UL 10.4 V d.c.
	Frequency at TP6, LL 199.990 kHz UL 200.010 kHz d.c. input 24 V
	Input SK7, 30 MHz, 1 V r.m.s. Output SK6, 30.2 MHz, selective level meter UL 2.2 mV LL 0.7 mV Output SK6, 200 kHz, selective level meter 0.5 mV
Potentiometer Assembly	Connect 150 Ω load between pins 16 and 19. Connect d.v.m. on a.c. range across the resistor, it should indicate LL 3 mV UL 5 mV
	Disconnect Leads 25 and 26 to meter and connect them to the multimeter set to its 50 μA range. Connect a d.c. supply between Leads 23 (+ve) and 25 (-ve). With SB and d.c. inputs as shown below it should be possible to set the potentiometer to produce a meter current of 40 μA.

(continued)

Table 2502 - cont

Assembly (1)	Testing information (typical figures) (2)				
	SB posn	Adjust preset	D.C. input V LL	D.C. input V UL	Remarks
	2	R73	0.86	1.05	
	3	R75	1.4	1.7	
	4	R77	3.45	4.2	
	5	R79	2.55	3.1	
	6	R81	4.2	5.15	
	7	R83	0.32	0.4	
	8	R85	0.67	0.82	
	9	R87	6.0	7.37	
	10	R89	2.8	3.4	
	11	R91	0.39	0.47	
	12	R93	3.57	4.4	
	13	R95	3.1	3.8	
	14	R97	1.1	1.35	
	15	R99	0.31	0.39	Input to Lead 27
Attenuator Assembly	100 dB section: 0 to 70 dB in 10 dB steps ± 1 dB per step. 10 dB section: 0 to 10 dB in 1 dB steps ± 0.1 dB per step.				
Coacial Switch Unit	a. SA in TX POWER CHECK position. D.V.M. loaded with 4.7 kΩ connected between Pin 23 and chassis. Inject 1000 Hz 5 V to PL3. D.V.M. should indicate LL 2.3 V UL 2.9 V a.c. b. As a. but d.v.m. connected to Pin 27, LL 4.8 V UL 6.0 V a.c.				
	SA to RX/COMMS check. D.V.M. and 4.7 kΩ load to Pin 23 and chassis. Inject 1000 Hz 5 V to SK11, temporarily connect Pins 15 and 26 of SA. D.V.M. should inciate LL 5.8 V UL 7.2 V.				

Table 2503 - FORWARD coding

Note...
This list of Assembly Codes must be used in conjunction with Mgmt J 021 Part 4.

Assembly Code (1)	Designation (2)
0100	Case of Lid Assembly
0200	Front Panel Assembly
0300	Oscillator/Mixer Unit Assembly
0400	Load Unit Assembly
0500	Attenuator Assembly
0600	Coaxial Switch Assembly
0700	Potentiometer assembly

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END of Part 2